Series RMT

Code No. RSPL/1

Roll No. | | | | | | | |

Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **7** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **34** questions.
- **Please write down the Serial Number of the question before attempting it.**
- **15 minutes time has been alloted to read this question paper.**

SUMMATIVE ASSESSMENT-II
MATHEMATICS

Time allowed : 3 hours *Maximum Marks : 90*

General Instructions :

(i) *All questions are compulsory.*

(ii) *The question paper consists of **34** questions divided into four sections — **A**, **B**, **C** and **D**.*

(iii) *Section **A** contains **8** questions of **1** mark each, which are multiple choice questions, Section **B** contains **6** questions of **2** marks each, Section **C** contains **10** questions of **3** marks each and Section **D** contains **10** questions of **4** marks each.*

(iv) *In question on construction, the drawing should be neat and exactly as per the given measurements.*

(v) *Use of calculators is not permitted.*

SECTION A

Question numbers 1 to 8 carry 1 mark each. For each of the question numbers 1 to 8, four alternative choices have been provided, of which only one is correct. Select the correct choice.

1. Two coins are tossed simultaneously, the probability of getting at most one tail is

   (a) $\frac{1}{3}$ (b) $\frac{3}{4}$

   (c) $\frac{1}{6}$ (d) $\frac{1}{9}$

2. A lamp post $2\sqrt{3}$ m casts a shadow 6 m long on the ground, the sun's elevation at this moment is

   (a) 30° (b) 60°

   (c) 90° (d) 45°

3. A box contains balls numbered 5 to 30. A ball is drawn from the box , the probability that the ball drawn has prime number is

   (a) $\frac{8}{25}$ (b) $\frac{2}{5}$

   (c) $\frac{4}{13}$ (d) $\frac{7}{25}$

4. In figure 1, PT and PR are two tangents to a circle with centre O, such that $\angle ROT = 135°$, then the measure of $\angle TPO$ is

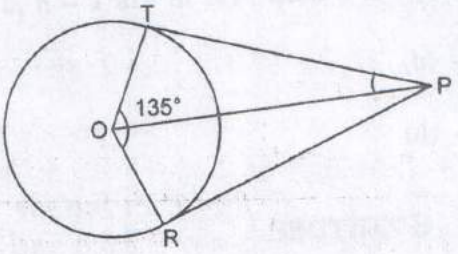

Figure 1

   (a) 90° (b) 45°

   (c) 135° (d) 22.5°

5. In figure 2, AC and BD are two common tangents to the circles, which touch each other at D, if B lies on AC such that BD = 5 cm, then length of AC is

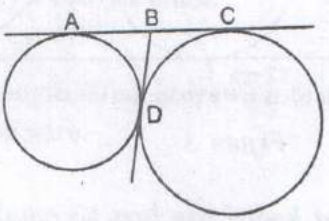

Figure 2

(a) 2.5 cm (b) 10 cm

(c) 15 cm (d) 12 cm

6. A point on y-axis which is equidistant from the points (0, –1) and (0, 7) is

(a) (3, 0) (b) (0, 3)

(c) (4, 0) (d) (0, 4)

7. If the area of the circle is numerically equal to twice the circumference of the circle, the diameter of the circle is

(a) 6 units (b) 10 units

(c) 8 units (d) 4 units

8. If $3k - 1, k + 3, k - 1$ are in A.P. then k is equal to

(a) 4 (b) -4

(c) 2 (d) -2

SECTION B

Question numbers 9 to 14 carry 2 marks each.

9. In figure 3, a circle is inscribed in a ΔABC. If AB = 12 cm, AC = 10 cm and BC = 8 cm, find AD, BE and CF.

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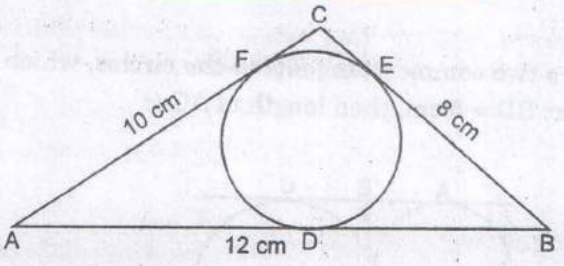

Figure 3

10. Two concentric circles with centre O, AB is a chord of the outer circle and the tangent to the inner circle at P. If OP = 4 cm and OB = 5 cm, find the length of AB.

11. In figure 4, a circle of radius 5 cm is inscribed in a square. Find the area of the shaded region.

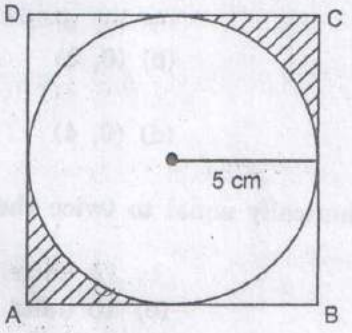

Figure 4

12. Which term of the A.P. 3, 15, 27, 39, ... is 132 more than its 54th term ?

13. Solve for x : $10ax^2 - 6x + 15ax - 9 = 0$, $a \neq 0$

14. A and B are friends. What is the probability that both will have birthdays

(a) on the same day ?

(b) on different days ? (1 year = 365 days).

SECTION C

Question numbers 15 to 24 carry 3 marks each.

15. A copper rod of diameter 1 cm and length 20 cm is drawn into a wire of length 20 m of uniform thickness. Find the thickness of the wire.

16. Three identical cubes each of volume 64 cm^3 are joined together end to end. Find the surface area of the resulting cuboid.

17. In figure 5, OACBO represents a quadrant of a circle with centre O and radius 7 cm. If OD = 5 cm, find the area of the shaded region.

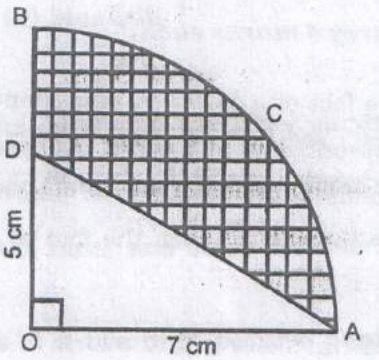

Figure 5

18. The rainwater from the roof measuring 22 m × 20 m drain into two conical vessels having diameter of base 2 m and height 3.5 m. If both the vessels are just full, find the rainfall in mm.

19. If (a, b) is the mid-point of the line segment joining the points A(10, – 6) and B(k, 4) and a – 2b = 18, find the value of k and the distance AB.

20. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with the ground. The distance from the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree initially.

21. Solve for x: $(a + b)^2x^2 + 8(a^2 - b^2)x + 16(a - b)^2 = 0$. $a + b \neq 0$, $a \neq b$.

22. Find the sum of all three digit numbers which on dividing by 11 leave remainder 5.

23. Construct a triangle ABC, in which AB = 4 cm, $\angle B = 120°$ and BC = 5 cm. Construct another triangle AB'C' such that $AB' = \frac{4}{5}AB$.

24. In what ratio does y-axis divide the join of (–2, 1) and (4, 5) ? Find the coordinates of the point of intersection.

SECTION D

Question numbers 25 to 34 carry 4 marks each.

25. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point.

26. An open container made up of metal sheet is in the form of a frustum of a cone of height 7 cm with radii of lower and upper circular ends as 4 cm and 10 cm respectively. Find the cost of oil which can completely fill the container at the rate of ₹ 100 per litre.

$[\pi = \frac{22}{7}]$

*27. Twice the perimeter of a park is 164 m and its three times area is 1200 sq. m. Find the length and breadth of the park. One fourth portion of the park is marked for greenery and walking, and playing is not allowed. Would you justify keeping an area reserved for greenery ? Which other steps would you suggest to keep the park well maintained ?

* Value Based Question

28. Prove that radius of a circle is perpendicular to the tangent at the point of contact.

29. Two circles with centres O and O′, and of radii 3 cm and 4 cm respectively intersect at two points P and Q such that OP and O′P are the tangents to two circles, find the length of the common chord PQ.

30. A bag contains 6 red balls and few blue balls. If the probability of drawing a blue ball from the bag is twice that of a red ball, find the number of blue balls in the bag.

If 5 green balls are added in the bag and a ball is now drawn, then what is the probability of getting (i) white ball ? (ii) blue ball ?

31. The difference between the outer and the inner curved surface area of a hollow right circular cylinder 14 cm long, is 88 cm^2. If the volume of the metal used in making the cylinder is 176 cm^3, find the inner and outer diameter of the cylinder.

32. The product of the digits of a two digit positive number is 24. If 18 is added to the number then the digits of the number are interchanged. Find the number.

33. If A(3, 0), B(4, 5), C(–1, 4) and D(–2, –1) be the four points in a plane, show that ABCD is a rhombus but not a square.

34. Find the value of the middle most term(s) of the arithmetic progression –11, –7, –3, ..., 49.